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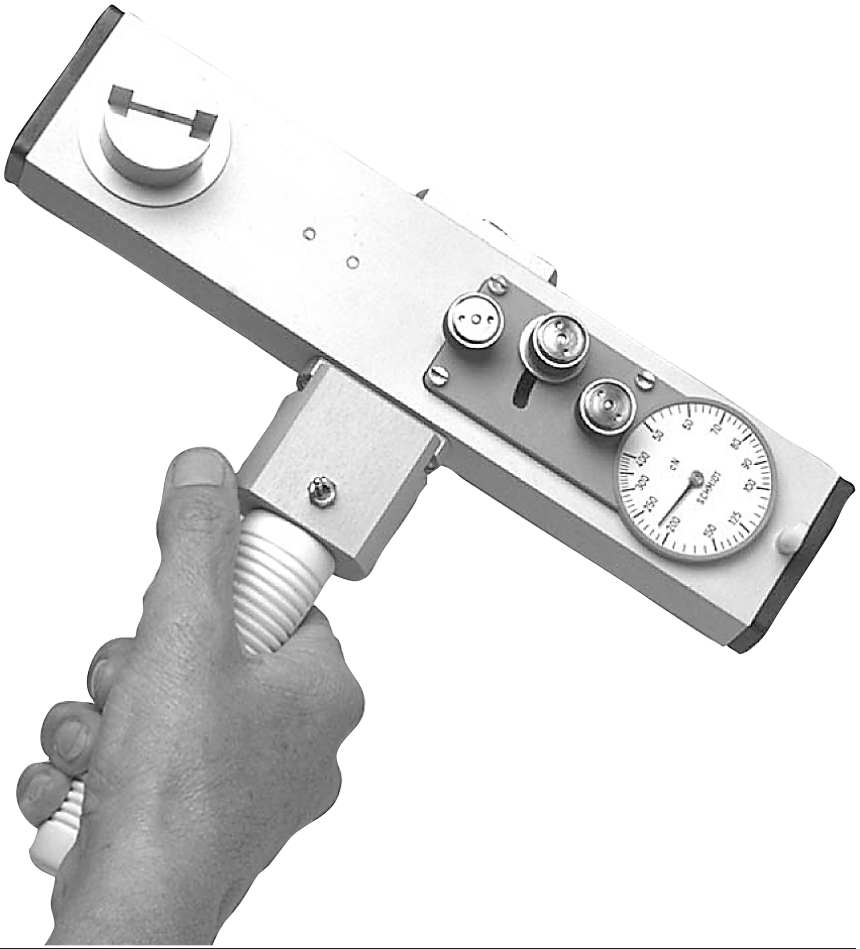
Model MKM
Tensionmeter



Operating Instructions

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7.0 WARRANTY

ELECTROMATIC Equipment Co., Inc. (ELECTROMATIC) warrants to the original purchaser that this product is of merchantable quality and confirms in kind and quality with the descriptions and specifications thereof. Product failure or malfunction arising out of any defect in workmanship or material in the product existing at the time of delivery thereof which manifests itself within one year from the sale of such product, shall be remedied by repair or replacement of such product, at ELECTROMATIC's option, except where unauthorized repair, disassembly, tampering, abuse or misapplication has taken place, as determined by ELECTROMATIC. All returns for warranty or non-warranty repairs and/or replacement must be authorized by ELECTROMATIC, in advance, with all repacking and shipping expenses to the address below to be borne by the purchaser.

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ELECTROMATIC Equipment Co., Inc.
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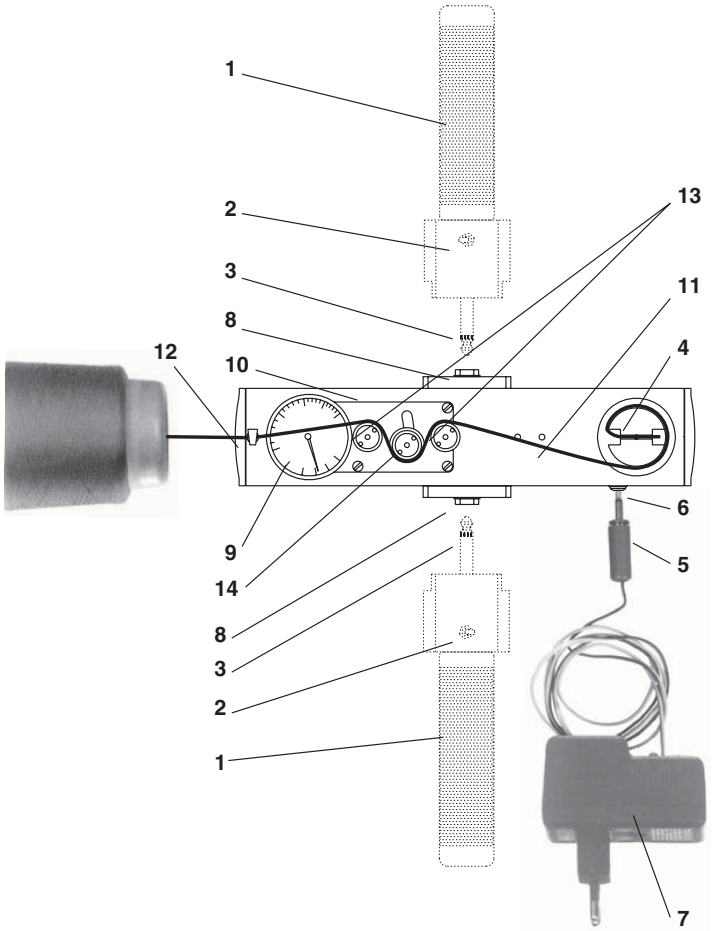
Contents

CAUTION

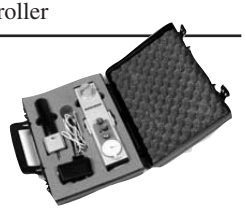
Tensions that exceed the tension range of the MKM instrument by more than 100% may cause permanent damage to the movement and must be avoided under any circumstances.

1.0 Overview



1. Tension meter handle
2. Motor switch
3. Jack plug 6.35*mm* ø
4. Take-up wheel
5. Charger connector
6. Jack plug 3.5*mm* ø
7. Battery charger
8. Jack socket 6.35*mm* ø for handle
9. Scale
10. Tension meter body
11. Process material
12. Guide eye
13. Outer rollers
14. Measuring roller

The MKM tension meter is shipped as a complete kit that includes the gauge, battery, battery charger and operating instructions in a hard plastic case.



6.0 Service and Maintenance

The tension meter is easy to maintain. Depending on operating time and load, the tension meter should be checked according to the locally valid regulations and conditions.

6.1 Rollers

You should regularly inspect the rollers to assure that they are running easily and smoothly. You can replace the rollers yourself, as necessary. When ordering spare rollers, please indicate the tension meter model and the serial number (on the rear side of the tension meter).

Ordering of spare rollers

Model: MK-12 (on the right side of the tension meter)

Serial number: 300 -888888 (on the right side of the tension meter)

Standard rollers: Order number R12013

6.2 Cleaning

For cleaning the unit, do not use any AGGRESSIVE SOLVENTS such as trichloroethylene or similar chemicals. NO WARRANTY OR LIABILITY shall be accepted for damage resulting from improper cleaning.

6.3 Verification Intervals

The question of finding the right frequency of calibration accuracy verification depends on several different factors:

- Operating time and load of the tension meter
- Tolerance band defined by the customer
- Changes of the tolerance band compared to previous verifications of calibration

Therefore, the interval between verifications must be determined by the user`s Quality Assurance Department based on the user`s experience. Assuming normal operating time and load as well as careful handling of the tension meter, we recommend a verification interval of 1 year.

5.0 Technical Information

51 Specifications

Calibration	According to SCHMIDT factory procedure
Accuracy	± 1% full scale (FS) or ± 1 graduation on scale
Take up speed	16 m/min
Scale diameter	41 mm
Temperature range	10 – 45°C
Air humidity	85% RH, max.
Housing material	Plastic (Makrolon)
Housing dimensions	210mm x 225mm x 54 mm (L x W x H)
Weight	approx. 650 g (fully assembled and ready to operate)

5.2 Available Models

Type	Tension Range cN	Measuring Hand Width mm	Calibration Material
MKM-50	5 - 50	225	PA: 0.12 mm Ø
MKM-100	10 - 100	225	PA: 0.12 mm Ø
MKM-400	50 - 400	225	PA: 0.20 mm Ø

** Suitable for 95% of applications. PA = Polyamide Monofilament If the material to be measured differs significantly from the factory calibration material in diameter, rigidity, shape, etc., we recommend calibration using customer material. For this purpose, a material sample of about 5 m should be supplied. International unit for tension force:1 cN = 1.02 g = 0.01 N

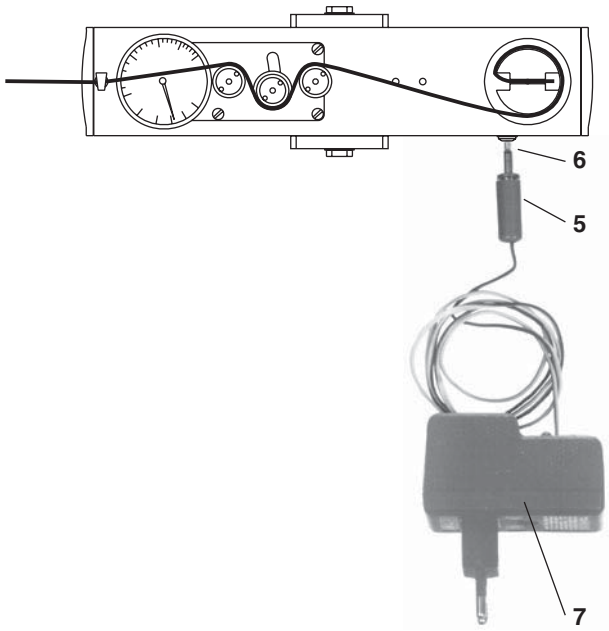
2.0 Charging the Battery

Before using your tension meter for the first time, the built-in battery must be charged. The built-in battery should be recharged after every six hours (maximum) of use.

Plug the battery charger (7) into the appropriate power source. Connect the jack plug (3) of the battery charger (7) with the charger connector (5) of the tension meter.

NOTE: Battery charging time is 14 hours.

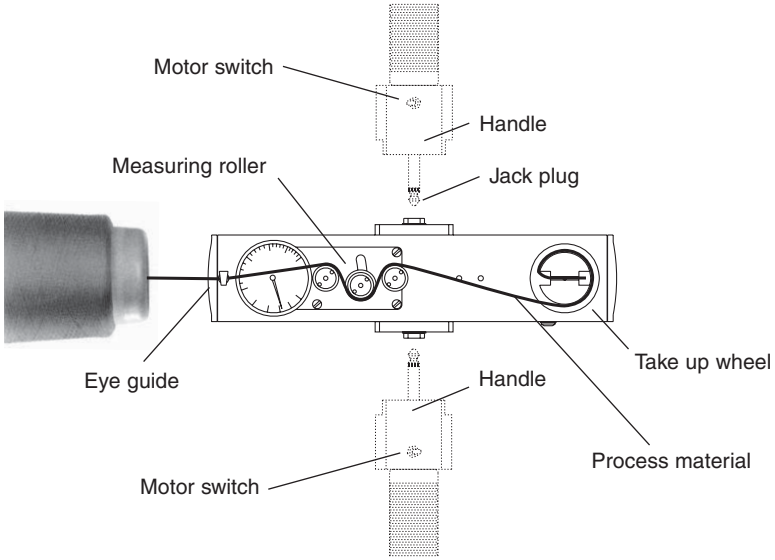
CAUTION **To avoid damage, do not move the center roller by hand.**



3.0 Operating Procedure

NOTE: To facilitate easy use, the MKM handle can be attached to the top or bottom of the gauge body (see diagram on page 2).

1. Depending on the orientation of use, plug in the jack plug of the handle at either of the two jack sockets provided on the sides of the tension meter.
2. Thread the process material through the guide eye, the outer rollers and the measuring roller. Then wind the process material around the take-up wheel two or three times.
3. Press the motor switch to start measuring. The scale now shows the measured tension values. If the scale does not show a reading, the process material may be threaded throug the rollers incorrectly. Not the proper position of the process material in the diagram below and retry.



4.0 Verifying the MK Calibration

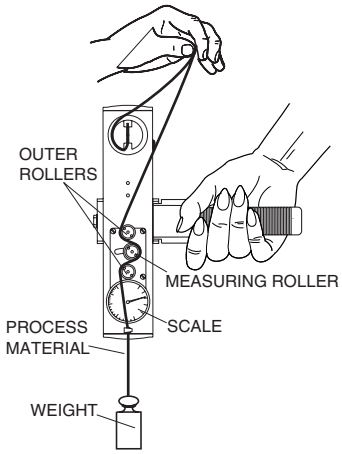
All tension meters are calibrated with standard materials—such as polyamide monofilament (PA)— according the factory procedure. Filament sizes are noted in Section 5.2.

NOTE: Any difference in process material size and rigidity from the standard material may cause a deviation of the accuracy.

In 95% of all industrial applications the factory calibration has been proven to provide the best results and is used for comparative purposes.

If the process material differs significant in size, rigidity and shape we recommend special calibration using customer`s sample. For this purpose a material sample of 5 meters in length should be supplied.

1. Suspend a known weight that corresponds to the tension to be measured (pay attention to the correct unit of measure) from the process material, vertically, as shown in the figure. Always use a fresh portion of the material to be measured.
2. Before the final check, move the process material slowly up and down to compensate any friction caused by the instrument and thus ensure the repeatability.
3. The tension value should be equal to the value of the suspended weight.



If this procedure shows a deviation beyond the allowable tolerance and reliable operation is no longer possible, the instrument must be returned to the factory for recalibration or repair.